

REMARKS

I. Status of the Application

Claims 1-11, 13, 14 and 23-31 are pending in this application. Claims 12 and 15-22 have been cancelled. In the October 17, 2005 office action, the Examiner rejected claims 1-11, 13, 14 and 23-31 under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent No. 6,772,512 to Tsai (hereinafter "Tsai") in view of U.S. Patent No. 4,881,885 to Kovac et al. (hereinafter "Kovac").

In this response, applicant has amended claims 1 and 23. Applicant respectfully traverses the rejection of the pending claims and requests reconsideration in view of the foregoing amendments and the following remarks.

II. Claims 1 and 23 are Patentable Over Tsai and Kovac

In the October 17, 2005 office action, the Examiner rejected claims 1 and 23 as allegedly being obvious over Tsai in view of Kovac. Neither Tsai nor Kovac teach or suggest all the limitations of claims 1 or 23, as amended. Furthermore, the examiner's rejection of claims 1 and 23 as set forth in the October 17, 2005 office action is unclear, and applicant maintains that the examiner has provided no motivation or suggestion to combine Tsai and Kovac. It is therefore respectfully submitted that the obviousness rejection of claims 1 and 23 should be withdrawn.

A. The Present Invention

Claim 1 is directed to an arrangement for use in a package that includes a supporting substrate, an interconnect layer, a chip, an encapsulation material, and an escape prevention

structure. The supporting substrate has a bond opening therein. The interconnect layer is disposed on the supporting substrate and includes a bonding channel that overlaps with the bond opening. The chip is fixed to the interconnect layer to cover the bonding channel. Bond wires pass through the bonding channel and the bond opening from pads of a chip fixed to the interconnect layer to the surface of the supporting substrate opposite the chip (see specification of present application page 9, lines 29 to 33). With the bond wires inserted into the bond opening and the bonding channel, the encapsulation material is introduced into the bonding channel via the bond opening (see specification of present application page 10, lines 9 to 16). The encapsulating material is introduced in order to mechanically mount and isolate the bond wires against each other (see specification of present application, page 2, lines 7 to 11). The escape prevention structure enables escaping of air from the bonding channel and substantially prevents the encapsulation material from escaping from the bonding channel.

B. Tsai

Tsai teaches a method of fabricating a flip chip ball grid array package without causing mold flash. The package includes a substrate 210, a chip 220 connected to the substrate using a ball grid array 221, and contact pads 230. The contact pads 230 extend from the side of the substrate opposite the side to which the chip 220 is attached. (See e.g. Tsai at Fig. 2D). The package is encapsulated, except for the contact pads 230. To this end, the package is placed in a specially designed molding fixture. The encapsulation material is passed above and below the chip 220 and freely flows on both sides of the chip and then finally out through a hole 211 in the substrate. On the opposite side of the substrate, further lateral flow is impeded by false contact pads 231. (*Id.* and accompanying text). Tsai does not

disclose the concept of a bond wire extending through a channel.

C. Kovac

Kovac relates to an apparatus that encapsulates a surface and leads of a chip. The apparatus includes a fixture for holding the chip. The fixture includes a recessed well 14 into which the chip is placed. The chip 24 is held within the well by a vacuum applied to the backside of the chip. The Kovac apparatus includes conduits 20 that restrict the overflow of the coating material as a consequence of a combination of factors. The three factors include the rapid removal of solvent from the coating, the rapid formation of skin of crosslinked material, and a momentum balance between the coating deposition rate and air flow. The finished product of Kovac is removed from the fixture, and is illustrated in Fig. 5. Kovac does not disclose the concept of a bond wire extending through its respective openings and recesses.

D. The Cited References Do Not Teach or Suggest All Claim Limitations

In order to reject a claim under 35 U.S.C. § 103, all claim limitations must be taught or suggested by the prior art. MPEP § 2143.03. In the present case, claim 1, as amended, includes the limitation of “at least one wire connected to the chip and extending through the bond opening and the bonding channel.” A similar limitation is included for claim 23, as amended.

Tsai is clearly silent about bond wires extending through the channel between the inner ball grid 221 and overlapping the vent hole 211, and is further silent about bond wires extending through the vent hole 211. Kovac is also silent about bond wires extending through

its respective openings and recesses.

In view of the above, neither Tsai nor Kovac teach or suggest all the limitations of claims 1 and 23 of the present application, as amended. In particular, at least the limitation of “at least one wire ... extending through the bond opening and the bond channel” is absent from both Tsai and Kovac. Accordingly, it is respectfully submitted that neither Tsai nor Kovac teach or suggest all the claims limitations of claims 1 and 23, and the examiner’s rejection of these claims should be withdrawn.

E. The Examiner’s 35 U.S.C. Rejection is Unclear, and
There Is No Motivation or Suggestion to Combine the References

In the October 17, 2005 office action, the Examiner appears to suggest that the limitation of an escape prevention structure is inherent in both Tsai and Kovac. (See October 17, 2005 office action at pp. 3-4). Thus, there is some confusion concerning the rejection under 35 U.S.C. § 103. If all limitations are taught by Tsai or Kovac alone, a rejection under 35 U.S.C. § 102 would be proper. Similarly, if all limitations are obvious to Tsai or Kovac alone, a rejection under 35 U.S.C. § 103 would be proper. However, the examiner has rejected claims 1 and 23 as being unpatentable over Tsai “in view of Kovac”. Clarification is requested.

Furthermore, assuming the Examiner’s rejection of claims 1 and 23 is under 35 U.S.C. § 103, as stated in the October 17, 2005 office action, it is respectfully submitted that there is no motivation or suggestion to combine the references. In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation to combine the reference teachings. MPEP § 2143. A motivation to combine references is required to “prevent the use of hindsight based on the invention to defeat patentability of the invention.” See In re

Rouffet, 149 F.3d 1350 (Fed. Cir. 1998). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680 (Fed. Cir. 1990).

In the present case, the examiner has made a 103 rejection over Tsai in view of Kovac. The examiner has made arguments for what is taught by Tsai and Kovac individually. However, after reading the office action of October 17, 2005, applicant fails to find a statement of motivation or suggestion for combining Tsai and Kovac. An obviousness rejection cannot be based on a mere combination of references. There must be a legally sufficient motivation or suggestion to combine teachings of different references. As stated in MPEP § 2142:

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. 'To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.' *Ex parte Clapp*, 227 USPQ 972. ...

"When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper." (MPEP § 2142.) Because the examiner has not provided any motivation or suggestion in the references that would suggest a combination of the references, it is respectfully submitted that the examiner has not made a *prima facie* case of obviousness, and the rejection of claims 1 and 23 should be withdrawn.

In view of the foregoing, it is respectfully submitted that the examiner's basis for the rejection in the October 17, 2005 office action is unclear and is improper. If the examiner's

objection is under 35 U.S.C. § 102, the rejection should be stated as such. If the rejection is under 35 U.S.C. § 103, a statement of what limitation is missing from Tsai should be provided along with a reference to where the limitation is found in Kovac, and a suggestion or motivation for combining the references should be provided from the art.

F. Conclusion as to Claims 1 and 23

For the multiple independent reasons discussed above, as well as others, it is respectfully submitted that the obviousness rejection of claims 1 and 23 over Tsai and Kovac should be withdrawn.

III. Claims 2-11, 13, 14 and 24-31

Claims 2-11, 13, 14 and 24-31 also stand rejected as allegedly being obvious over Tsai in view of Kovac. Claims 2-11, 13, 14 and 24-31 depend from and incorporate all of the limitations of either claim 1 or claim 23. Accordingly, for at least the same reasons as those set forth above in connection with claim 1 and claim 23, it is respectfully submitted that the rejection of claims 2-11, 13, 14 and 24-31 over Tsai and Kovac should be withdrawn.

IV. Conclusion

For all of the foregoing reasons, it is respectfully submitted the applicants have made a patentable contribution to the art. Favorable reconsideration and allowance of this application is, therefore, respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Russ Fowler", with a long horizontal flourish extending to the right.

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